Remarks

The office action of December 21, 2009 has been carefully reviewed. In response to this office action, claims 24, 27, and 28 have been amended. Claims 29 and 31-34 have been canceled, and new claims 35-38 have been added. Claims 24, 26-28, and 35-38 are currently pending and presented for review. Favorable reconsideration and allowance are respectfully requested in light of the remarks which follow.

Interview Summary

Applicant's representative wishes to thank Examiner Zhe for the courtesy extended during a telephonic interview on February 18, 2010. During this interview, a proposed amendment to claim 24 was discussed with respect to the prior art references cited in the pending Office Action. Differences discussed related to 1) industrial controllers generally, 2) an application executing on and requiring resources from multiple controllers, and 3) the fixed time requirements of industrial controllers. No agreement on allowable subject matter was reached because an amendment to overcome the current references will require additional searching.

Claim Rejections – 35 U.S.C. § 103

Claims 24, 26-29, and 31-34 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith et al., International Publication No. WO 98/42101 (herein "Smith") in view of Zweben et al., U.S. Patent No. 6,216,109 (herein "Zweben"). Applicant submits that amended claims 24 and 27 patentably define over Smith in view of Zweben.

Independent claims 24 and 27 have both been amended to require that the method is performed on a system including "industrial controllers." As defined in paragraph [003] of the present application, "industrial controllers" are "special purpose computers used for controlling industrial processes and manufacturing equipment." Neither Smith nor Zweben disclose using an industrial controller.

The combination of Smith and Zweben also fail to teach or suggest that the application program execute within a fixed time interval as required by claims 24 and 27.

Claims 24 and 27 require "that the new control application program can be executed within the fixed time interval" and only allocate "the new control application program to the identified control hardware resources if the new control application program can be executed within the fixed time interval." As stated in paragraph [0057], if the portions of the new application allocated to each industrial controller cannot be performed within the allocated time, an error is reported.

In contrast, Smith discloses a completion time constraint according to the ability of a user to define a time of day during which the service may be provided. Smith does not require any portion of the networking application to be completed within the time interval defined by the user. In contrast, the time interval defined by the user in Smith only permits the application to execute during some portion of the day. The application may or may not run during that time, and further, the application may start running but not complete during the allocated time. Second, the time interval defined by the user as disclosed by Smith is associated with a terminal and not with the control application program.

Similarly, Zweben discloses defining a time limitation during which a task can be performed (col. 16, lines 39-57). Zweben again does not require the task to be performed during the defined time (see col. 17, lines 5-11 and col. 18, line 4). Zweben assigns a penalty if a particular scheduling constraint is not met, such as the defined time. However, each constraint violation need not be repaired. (col. 18, line 4). The method in Zweben attempts to iteratively reduce the number of constraint violations; however, other constraints, for example eliminating overtime, may be more important than meeting a due date. The iterative scheduling software will attempt to minimize the number of constraint violations, but does not guarantee the deterministic scheduling as required by an industrial controlled process.

For at least the above stated reasons, Applicant submits that independent claims 24 and 27, as well as claims 26 and 28 which depend from claims 24 and 27 respectively, are in condition for allowance. Claims 29 and 31-34 have been canceled.

New Claims

New claims 35-39 have been added. Each claim is dependent from either claim 24 or 27 and, therefore, for at least the reasons presented above, Applicant submits that claims 35-39 are in condition for allowance.

Applicant further submits that claims 35-39 are fully supported by the specification and introduce no new material. Claim 35 requires that the "real-time operating system maintains a topology map" and that "the step of identifying at least the first industrial controller and the second industrial controller is based at least in part on the network connections between the first and the second industrial controllers." These limitations are supported, for example, at paragraphs [0042]-[0043].

Claim 36 requires that "each portion of the application program further requires at least one of an amount of memory, a network bandwidth, and a processor bandwidth." This limitation is supported, for example, at paragraph [0050] and [0052].
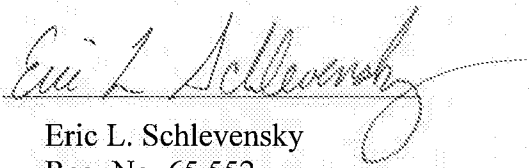
Claim 37 requires "a portion of the fixed completion time is allocated to the network connections between the first and the second industrial controllers." This limitation is supported, for example, at paragraph [0053].

Claim 38 requires "the first industrial controller is connected to a first control signal of a controlled process, the second industrial controller is connected to a second control signal from the controlled process, and a portion of the new control application program utilizes both the first and the second control signals." This limitation is supported by the specification, for example, at paragraphs [0045] and [0052].

Conclusions

In light of these remarks and amendments, it is believed that claims 24, 26-28, and 35-38 are in condition for allowance and allowance is respectfully requested. The Examiner is encouraged to contact the undersigned if minor amendments are needed in the figures, specification, or claims to bring this case into allowance.

Respectfully submitted,

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